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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/647,448 | 08/25/2003 | Hiroyuki Kumakura | 03310.033001 | 1648 |

7590 02/08/2007
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| EXAMINER |
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MUSSER, BARBARA J

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| ART UNIT | PAPER NUMBER |
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1733

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 02/08/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/647,448

Applicant(s)

KUMAKURA, HIROYUKI

Examiner

Barbara J. Musser

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1 and 3-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 1 recites the limitation "the connecting terminal" in 17. There is insufficient antecedent basis for this limitation in the claim. This is considered mean the connection terminal.

Regarding claim 15, it is unclear what is meant by reaction rate. It is unclear if this means the rate of reaction of the adhesive is 2-20% of a peak reaction rate, or if this means that the temperature is maintained until 2-20% of the adhesive has been reacted (It is noted that while this seems a more reasonable interpretation, the specification does not disclose such.). It is unclear how the temperature can be maintained to be a percentage of the reaction rate. No art reaction has been applied to this claim as its limitations cannot be determined.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 6, 7, 10, 11, 14, and 16 are rejected under U.S.C. 103(a) as obvious over Takeshita et al.

Takeshita et al. discloses a method of bonding a semi-conductor chip to a substrate with an electrically conductive adhesive such that the connection terminals of the chip and substrate are electrically connected by semi-setting the adhesive on the substrate using a heated pressure head, placing the chip on the semi-set adhesive, and pressing the chip with the heated pressure head at a higher temperature to electrically connect the chip to the substrate and cure the adhesive.(Col. 7, ll. 28-59) It is inherent that the placing of the chip requires some degree of pressure of the chip against the adhesive. It is noted that the claim does not require the chip to be on the adhesive prior to the first heating step, but only that it is pressed into the adhesive after it has been heated in the first heating step. The preamble only indicates the chip is placed on the adhesive prior to a heating step, not prior to the first heating step. This reads on the second heating and pressing step. Since Takeshita et al. discloses the adhesive is semi-set, one in the art would understand that it was heated above the reaction start temperature of the adhesive. It would have been obvious to one of ordinary skill in the art at the time the invention was made to heat the adhesive to less than its reaction peak temperature since the adhesive is intended to only partially set in the first heating set and heating it to above its reaction peak temperature would quickly cure the adhesive.

Regarding the limitation of the adhesive showing its lowest viscosity at a temperature higher than the reaction start temperature, Takeshita et al. discloses the adhesive liquefies after the first heating step.(Col. 7, ll. 57-59) This clearly shows the lowest viscosity, and since this is after the adhesive has semi-set(semi-cured) it is clearly after the reaction start temperature. It is noted the claim does not require the temperature of the lowest viscosity to be the temperature the adhesive is heated to in the first heating step.

Regarding the limitation of preheating the adhesive to reduce the viscosity of the adhesive, the adhesive is originally laid down.(Col. 7, ll. 30-31) This indicates the adhesive is originally a film.(Col. 7, ll. 40) Therefore, since the heating causes the adhesive to become a viscous material, i.e. a fluid material, the adhesive has reduced in viscosity since a liquid has a lower viscosity than a solid.

Regarding the limitation of the permanent bonding step contacting the connecting portions of the chip and substrate, Takeshita et al. discloses the connecting portions are connected.(Col. 7, ll. 61-65) Additionally, since the purpose of the process is to connect the chip and substrate, one in the art would understand that would occur.

Regarding the limitation of the viscosity of the adhesive is reduced when the chip is pressed into the adhesive, the viscosity of the adhesive has been reduced from it being a film to being a liquid. At this point the chip is pressed into the adhesive. This is not considered to require that the chip be pressed into the adhesive while the viscosity of the adhesive is being reduced.

Regarding claim 3, since the adhesive is intended to set, i.e. cure, in the second step, one in the art would understand that it was heated to above the reaction peak temperature.

Regarding claims 10 and 11, Takeshita et al. discloses heating a heatable head to press the chip into the adhesive.(Col. 6, ll. 33-35)

Regarding claim 14, Takeshita et al. discloses heating the adhesive, placing the chip on the adhesive, and heating it again.(Col. 7, ll. 33-50) This is considered to suggest that during the placement of the chip the adhesive temperature maintained, and during this maintaining the adhesive viscosity would increase since the adhesive is above its reaction start temperature and it would be reacting.

Regarding claim 16, Takeshita et al. discloses the adhesive is a thermosetting resin.(Col. 45-46) The reference does not disclose the type of thermosetting resin. Some of these resins require a curing agent to form the cured product. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any type of thermosetting resin in the adhesive of Takeshita et al. including those requiring curing agents to cure since Takeshita et al. is silent as to the type of thermosetting adhesive and since thermosetting adhesives that require curing agents are well-known in the adhesive arts.

3. Claims 4, 5, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshita et al. in view of JP 2-226738 and JP 11-330162 as set forth in the previous office action.

4. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshita et al. in view of JP 11-330162 as set forth in the previous office action.

Response to Arguments

5. Applicant's arguments filed 2/21/06 have been fully considered but they are not persuasive.

Regarding applicant's argument that Takeshita et al. discloses the adhesive has been semi-cured prior to placement of the chip, the adhesive viscosity has been reduced from that when it was a solid to that when it is a viscous material. It is noted that the claim does not require the adhesive viscosity to be reduced while the chip is pressed. The phrase "the viscosity of the adhesive is reduced" can be read to mean that the step of reduced the viscosity has already occurred.

Regarding applicant's argument that the adhesive of Takeshita et al. could have already cured before the chip contacts the substrate since the reference discloses the chip contacts the substrate, and the intention of the reference is to form a contact between the chip and the substrate, one in the art would appreciate that the adhesive would not fully cured before the two contact each other.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara J. Musser whose telephone number is (571) 272-1222. The examiner can normally be reached on Monday-Thursday; alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571)-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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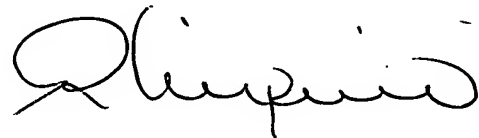
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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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